NOTES ON A COLLECTION OF FISHES OBTAINED IN THE GILA RIVER, AT FORT THOMAS, ARIZONA, BY LIEUT. W. L. CARPENTER, U. S. ARMY.

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The following is a list of the fishes collected by Lieut. W. L. Carpenter, U. S. Army, at Fort Thomas, on the Gila River, Arizona Territory, and sent by him to the museum of the University of Indiana, June 4, 1887.

Lieutenant Carpenter has sent with them a number of notes on the habits and local names of the fishes. It is his opinion that there are but these seven species found in the Gila River, at Fort Thomas, and that several of the species described from that stream are not really distinct. He states further, that *Gila emorii* and *Ptychochilus lucius* present varying characteristics with different stages of growth. These may have been taken for many species.

1. Catostomus latipinnis Baird & Girard.

One specimen, 19 inches long. This specimen agrees with the description of Jordan & Gilbert in the Synopsis of the Fishes of North America, except in having a longer preorbital bone, this being more than twice as long as deep. The dorsal is not deeply incised, its height not equal to length of head.

2. Catostomus gila Kirsch, sp. nov.

Three specimens, 12 to 14 inches long. This species is closely allied to *C. ardens* Jordan & Gilbert, but differs from it in having the body more compressed, the antedorsal region much less elevated, and not so full, the caudal peduncle shorter and more compressed, and the least depth in length $1\frac{3}{4}$. The dorsal is shorter and higher, its longest ray nearly twice the length of last, and longer than the base of fin, the free margin incised, the ventrals being longer and more pointed. Head subconic, preorbital broad, twice as long as wide; snout $2\frac{1}{4}$ in head; eye small, $6\frac{1}{2}$ in head, 3 in snout, and 3 in interorbital space; lips rather large, the upper with about 4 rows of papillæ, the lower divided by a narrow fissure, to near its base, into two fleshy lobes, each with about 6 rows of papillæ, the lobes about length of eye.

Dorsal short and high, its 4th ray midway between tip of snout and base of caudal fin on lateral line, the last ray little more than half the length of first; base of fin $1\frac{1}{4}$ in longest ray and $1\frac{1}{2}$ in head. Anal short and high reaching to base of caudal fin, its base 2 in that of dorsal, its longest ray (3d) slightly longer than that of dorsal. Caudal large, expanded, forked about $\frac{1}{3}$ of its median rays, width at origin $1\frac{1}{3}$ in base of dorsal; lower lobe the longer, its longest ray about equal that of dorsal.

Ventrals small, anterior insertion opposite middle of dorsal, their longes ray (3d) but slightly shorter than that of dorsal. Pectorals narrow bu long, reaching to front of pubic bones, their longest ray (4th) longe than that of dorsal and equal to that of ventral. Scales large, longe than deep, smaller anteriorly and crowded, largest on peduncle of tail and smallest on breast.

Color (alcoholic): above, and sides to axils of pectorals, dark brown the scales being dark at base and covered with dark punctulations below yellow; the fin membranes dark. Lateral line abruptly decurved near its origin, then running on median line of body to caudal fin Head $4\frac{1}{2}$ in body; depth $4\frac{1}{2}$; D. 11 to 12; A. 7; scales 11—58 to 60—10. One of the typical examples has been sent to the U. S. National Museum.

3. **Catostomus insignis** Baird & Girard.

One specimen, $12\frac{1}{2}$ inches long. Scales on sides of moderate size, larger anteriorly than posteriorly, but so covered that the contrary seems to be true; the anterior scales are of a circular outline, the posterior nearly twice as long as deep. Those on the back very large, those on the belly very small, only about half as large as the former.

4. **Catostomus Clarki** Baird & Girard.

One specimen, 12 inches long. The scales on back not quite so large as those of *C. insignis*, but otherwise similar in size and arrangement to those of that species. Scales on lateral line 68.

5. **Xyrauchen*** **cypho** (Lockington).—Buffalo Fish.

This species, *Catostomus cypho* Lockington, seems to be the type of a distinct genus, *Xyrauchen* Eigenmann & Kirsch, gen. nov.

The genus *Xyrauchen* agrees with the genus *Catostomus*, except in having behind the occiput a very large sharp-edged hump formed by the singularly developed anterior interneurals.

The anterior portion of the hump is supported by a large interneural formed by a thick central pillar with anterior and posterior wings, the former coming to a point on the medial projecting plate of the supra-occipital, forming a large opening beneath it; the latter wing is somewhat smaller and articulates with the second interneural. The upper margin of the first interneural is highest at the point of the central pillar, from which it slopes anteriorly and posteriorly. "The base of the central pillar is expanded transversely, giving a double articulating surface on its under side" (Lockington). The next interneural is a thin, flat, sub-rectangular plate; the third is an irregular flat plate about half as large as the second, while the next three are small flat plates above and bent forward.

The interneurals of the dorsal fin with a central ray and an anterior and posterior expansion, which does not, however, extend to their lower

* Ξυρός, razor; αὐχήν, nape.

ends. The one supporting the first two rays is formed by two interneural bones united by a thin bony plate, which forms no expansion in front of the first and but a narrow one behind the second. Upon the first vertebra is a broad, irregular surface for the reception of the first interneural bone. "The transverse processes of the first vertebra are broadly expanded inferiorly, and their lower edges united by a suture to a pair of large bony plates of complex form, connecting the air-bladder with the back of the skull." (Lockington.) From the anterior margin of each neurapophysis of the next eight or nine vertebræ, and resting upon the zygopophysis of the preceding vertebra, spring processes which are directed upward and forward; these in the first three vertebræ form arches surmounted by spines which are about half as long as the interneural spine. These processes diminish in size on each successive vertebra.

The following is a description of the species. Body stout, elongated, compressed posteriorly, anterior outline in a slightly convex line from tip of snout to occiput, where commences a prominent hump, which reaches its greatest height at a distance from the occiput about equal to the length of the snout, and thence descends in a straight line. Ventral outline from mouth to anal fin almost straight. Head small, elongate, conical, top of head $2\frac{1}{2}$ times in distance (in a straight line) from tip of snout to front of dorsal; snout $2\frac{1}{2}$ in head; eye small, 3 in snout, $7\frac{1}{4}$ in head; width of preorbital 3 in its length; mouth rather wide, inferior; upper lip with two rows of papillæ, lower lip rather small, in two distinct fleshy ovoid lobes, with about eight rows of low, flat-topped papillæ; width of opercle about 3 in head; distance from posterior margin of eye to posterior margin of opercle equals distance from center of eye to tip of snout; posterior margins of opercle and subopercle form a continuous, bold, convex curve.

Dorsal low and long, its margin incised, third ray midway between tip of snout and base of caudal fin on lateral line, its base $1\frac{1}{3}$ in length of head, second ray longest, which is $1\frac{1}{3}$ in its base and twice length of last ray. Ventrals falcate, anterior insertion opposite middle of dorsal, reaching to within $\frac{1}{2}$ of their length of the vent; their longest ray (3d) about 2 in head, and twice length of last. Anal short and reaching to rudimentary rays of caudal, its longest ray contained $1\frac{1}{2}$ in head. Caudal broad and strong, forked about $\frac{1}{2}$ its length; caudal peduncle stout, compressed, widening considerably toward the caudal base, least depth $2\frac{1}{3}$ in its length, measured on lateral line; longest ray about $1\frac{1}{7}$ in head; rudimentary rays well developed. Pectorals lanceolate, placed low, reaching to near front of pubic bones, their longest ray equal to that of dorsal. Scales cycloid, variable in size, longer than high, scarcely imbricated. Largest scales of body upon the peduncle of the tail, being almost twice as long as high. Ridge of dorsal hump without scales. Lateral line decurved near its origin, then running on the median line of the body to the caudal fin.

"Color (December) dark brown with a brassy reflection, yellow below. Iris brown, reddish tinted. Pharyngeal teeth in a single row small, numerous, over 35." (Carpenter.) Peritoneum black; intestine simple, 5½ times length of body. Head 4 in body; depth 4; D. 13; A 7; scales 17–77–12.

6. Ptychochilus lucius Girard.—Gila Salmon.

One specimen, 15 inches long. It agrees in general with Jordan & Gilbert in Synopsis Fishes North America. "Peritoneum silvery vertebræ 45 to 46." (Carpenter.)

7. Gila emorii Baird & Girard.—Gila Trout; Bony Tail.

Six specimens ranging from 8 to 14 inches in length. They agree with the description of Jordan & Gilbert in Synopsis Fishes North America, except in the following characteristics: In the greater number of specimens the maxillary does not reach to the front of the orbit; the pectorals not quite reaching to front of pubic bones; front of dorsal about equal to distance between tip of snout and base of caudal fin measured on the lateral line; least depth of caudal peduncle 4 in its length.

"Color (October), back dark, sides light, belly bright silvery; dorsal darker, caudal brown; iris pink tinted. Peritoneum dusky. Pharyngeal bone falciform, with several foraminæ inferiorly. Teeth, pharyngeal, falcate, compressed, with grinding surface, usually but two or three of the large teeth worn; 2, 5–4, 3, sometimes 2, 5–4, 2. Vertebræ 42 to 45. Scales 26–87 to 90–21. Large specimens in November show but slight grinding surface. The food of this species consists almost entirely of *Gasteropods* and *caddis-worms*, which they crush with their powerful pharyngeals. As they do not feed much during winter, the grinding surface is almost obliterated at that season through disuse; the species might thus have been described as without grinding surface.

"The young differ greatly from the old; the cranium probably not becoming depressed until the second year. A specimen found 4 inches in length with the cranium not perceptibly depressed, and the eye 4 in head. In spring the iris is reddish. They are very tenacious of life. They have revived after being several hours out of the water and having become perfectly dry and stiff. They take the hook freely." (Carpenter.)

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